FISCHER MESS- UND REGELTECHNIK

Operating Instructions

ME50 | Programmable Pressure Transducer / Pressure Switch

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1 Safety instructions

1.1 General

This manual contains detailed information about the product and instructions for its installation, operation and maintenance. Operators and other technical personnel responsible for the equipment must read this thoroughly before attempting to install or operate this equipment. A copy of this manual must always be kept accessible at the place of work for reference by concerned personnel.

Chapter 1 (sections 1.2 through 1.7) contains general as well as specific safety instructions. Chapters 1 through 10, covering topics ranging from intended purpose of the equipment to its final disposal, also include important points relating to safety. Overlooking or ignoring any of these safety points can endanger humans and animals, and possibly cause damage to other equipment.

1.2 Personnel qualification

Personnel responsible for installation, operation, maintenance and inspection of this product must have the qualifications, training and experience necessary to carry out such work on this type of equipment.

1.3 Risks of disregarding safety instructions

Disregarding safety instructions, use of this product for purposes for which it is not intended, and/or operation of this product outside the limits specified for any of its technical parameters, can result in harm to persons, the environment, or the plant on which it is installed. Fischer Mess- und Regeltechnik GmbH will not be responsible for consequences in such circumstances.

1.4 Safety instructions for operators

Safety instructions for the proper use of this product must be followed. This information must be available at all times by personnel responsible for installation, operation, maintenance and inspection of this product. Adequate steps must be taken to prevent the occurrence of hazardous conditions that can be caused by electric energy and the convertible energy of the process media. Such conditions can, for example, be the result of improper electrical or process connections. Detailed information is available in relevant published norms (DIN EN, UVW in Germany; and equivalents in other countries), industrial standards such as DVWG, Ex-, GL-, VDE guidelines, as well as regulations of the local authorities (e.g., EVUs in Germany).

09005258 BA_EN_ME50 Rev.C 09/14

1.5 Modification forbidden

Modification or other technical alteration of the product is not permissible. This also applies to the use of unauthorized spare parts for repair / maintenance of the product. Any modifications to this product, if and as necessary, should be done only by Fischer Mess- und Regeltechnik GmbH.

1.6 Operational restrictions

The operational reliability of the product is guaranteed only when used for intended purposes. The product must be selected and configured for use specifically with defined process media. The limiting values of operating parameters, as given in the product specification sheet, must never be crossed.

1.7 Safety considerations during installation and maintenance

The safety instructions given in this manual, existing national regulations relating to accident prevention, and the internal safety rules and procedures of the user organization regarding safety during installation, operation and servicing must all be followed meticulously.

It is the responsibility of the users to ensure that only suitably qualified and experienced technical personnel are used for installation, operation and servicing of this equipment.

1.8 Explanation of symbols

WARNING!
... indicates a possible hazardous situation the non-observance of which might result in hazards to humans, animals, environment and objects.

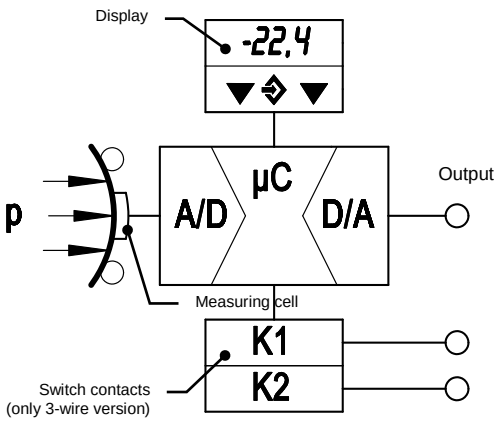
2 Intended applications

The pressure transmitter ME 50 is used for positive and negative pressure monitoring. The pressure transmitter can be used for measuring tasks in the field of environmental and renewable energy technology (biogas) as well as for process technology and process engineering.

If contaminated or aggressive media is available or expected on the system side, the device requires adaptation regarding the parts coming in contact with the media. We recommend contacting the manufacturer before ordering.

3 Product description and functions

3.1 Functional scheme



3.2 Principles of operation

Ceramic measuring cell:

The pressure acts directly on the ceramic diaphragm resulting in distortion. A pressure-dependant change in capacitance is measured at the electrodes of the ceramic carrier and the diaphragm.

Electronics integrated in the pressure transmitter housing now transform this change in capacitance into standard electrical signals.

Piezo-resistive measuring cell:

The pressure acts on the silicon diaphragm of a semi-conductor chip resulting in distortion. The specific resistance of the material changes according to the level of distortion.

Electronics integrated in the pressure transmitter housing now transform this change in resistance into standard electrical signals.

4 Installation

There are different connection variants for the process connection of the pressure transducer with which the connection to the process can be established. On the system side corresponding counterparts (screwed joint, flange, etc.) have to be provided.

By default the device is adjusted for a vertical installation position, the installation position, however, can be chosen. For installation positions deviating from the vertical, the zero point signal can be corrected with the inbuilt zero point adjustment.

The case protection IP65 is guaranteed only if an appropriate connection line is used (see accessories).

4.1 Process connection

- Only by authorised and qualified skilled personnel.
- When connecting the device the line has to be pressureless.
- The device has to be protected from pressure surges with appropriate measures.
- Observe suitability of the device for the media to be measured.
- Observe maximum pressures.

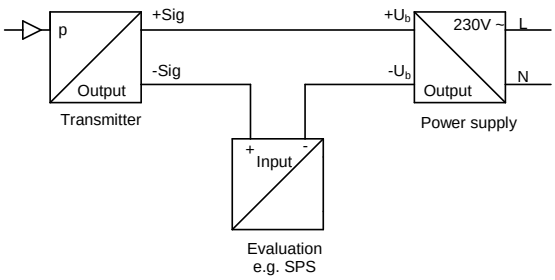
The pressure sensing line has to be laid with a slope in such a way that there will be no accumulation of condensation.

The pressure sensing line should be as short as possible and laid without tight bends to prevent disturbing delay times.

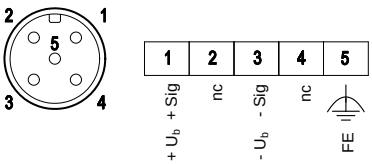
4.2 Electrical connection

- Only by authorised and qualified skilled personnel.
- Isolate the system before connection.
- Do not disconnect the connection plug under voltage.
- Earth the device (functional earth).

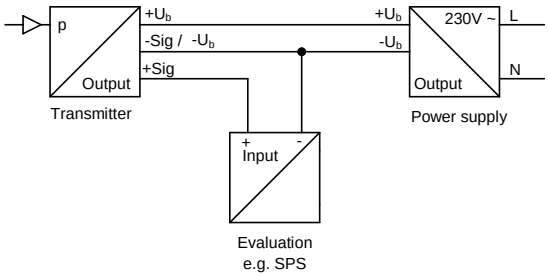
4.3 2-wire version



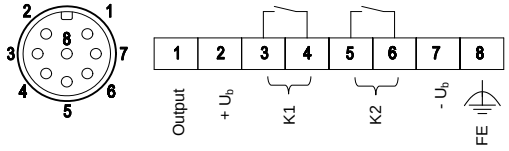
5-pole plug-in connector M12



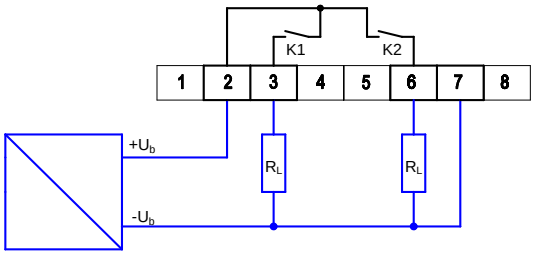
4.4 3-wire version



8-pole plug-in connector M12

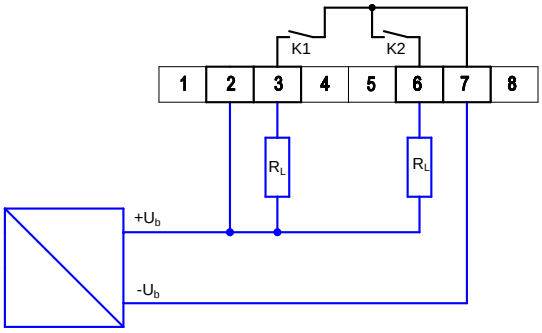


Contacts PNP switching:



The load is fixed to the earth (-Ub) of the operating voltage source. The output transistor of the amplifier switches the load in active state to the positive terminal of the operating voltage source.

Contacts NPN switching:



The load is fixed to the positive terminal of the operating voltage source. The output transistor of the amplifier switches the load in active state to the earth ($-U_b$) of the operating voltage source.

5 Commissioning

Requirement for the commissioning is the appropriate installation of all electrical supply and measuring lines. All connection lines have to be laid in such a way that no mechanical forces affect the device.

Prior to commissioning the tightness of the pressure connection lines has to be checked.

Parameterisation with the PC interface EU13 (see accessory) is possible only for the 2-wire version

5.1 Display / Controls

Key

▼ Arrow key Decrease value

Enter key

▲ Arrow key Increase value

In normal mode, the 3½ digit LCD display shows the current pressure value. The unit is displayed to the right of the measured value.[1]

Operation is done using a membrane keyboard with three keys. The keys can be accessed after the housing cover has been removed.

5.2 Set parameters

After switching on the device the software version number is displayed for a short moment and a display test is carried out. Afterwards the transmitter continues to normal operating mode.

During parameterisation either the respective menu item or the related parameter value is displayed on the display. The device continues its operation during parameterisation, thus changes have immediate effect.

Kindly note that the transmitter will display again the current measured value if no key was pressed for more than one minute.

For the setting of parameters proceed as follows:

- Press the Enter key to go to the menu. ESC is shown on the display.
- Use the arrow keys ▼ ▲ to select a parameter from the list shown below.
- Press the Enter key to call the parameter.
- Use the arrow keys ▼ ▲ to set the desired value.
- Press the Enter key to save the value.

After having set all parameters leave the menu as follows:

- Set the ESc parameter using the arrow keys ▼ ▲ This parameter can be found at the beginning as well as at the end of the parameter list.
- Press the Enter key to leave the menu.

5.3 Parameter list

Depending on the device model (2-wire/3-wire) some parameters are not available.

ESC Menu start/end

nA Measuring zero

Enter the pressure value corresponding to an output signal of 4mA.

nE Full scale

Enter the pressure value corresponding to an output signal of 20mA.

dP Damping measured pressure

For stabilising the pressure measuring set here the minimal rise time (0...200s).

SP1A Switch-off point relay 1

SP1E Switch-on point relay 1

SP1F Function relay 1

0 = Make contact
1 = Break contact
Always open in zero-current state.

SP1d Delay relay 1

Setting range 0...200 s
This value applies both for switching on and switching off.

SP2A Switch-off point relay 2

SP2E Switch-on point relay 2

[1] The unit is set on factory configuration in accordance with the ordered measuring range and cannot be changed. The same applies to the sensor temperature.

SP2F Function relay 2

0 = Make contact
1 = Break contact
Always open in zero-current state.

SP2d Delay relay 2

Setting range 0...200 s
This value applies both for switching on and switching off.

OFF Offset correction

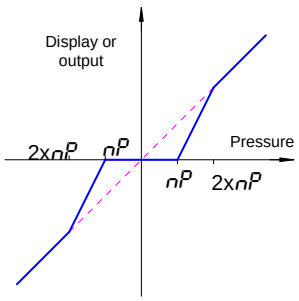
Correct here the measured pressure at zero point. The current measured value is displayed that can be changed by up to +/-10% of the basic range using the arrow keys.

SPAn Span correction

Correct here the span of the pressure measurement of up to +/-10% of the basic range. The current measured value is displayed that can be changed using the arrow keys.

nP Zero point window

Set here a range around the zero point in which the measurement value is fixed to zero. The specification is done in digits. Outside the range the measurement value is approximated as shown in the graphic.



I GI Lower current limit

Set the min. output signal (3.5...22.5mA). Enter 0 to deactivate the limitation.

I G2 Upper current limit

Set the max. output signal (3.5...22.5mA). Enter 0 to deactivate the limitation.

I Er Error signal

Set the output signal (3.5...22.5mA) which should be emitted in the event of an internal error of the device.

LASt Key lock

The keypad is locked if no key is pressed within a set time period (in minutes). Unlock the keys by switch the transmitter off and on again.

rSt Reset

If you set this parameter to 1 all parameters are reset to factory default settings. Kindly remember that this step is irreversible. All user settings will be lost.

ESC Menu end

6 Maintenance

The instrument is inherently maintenance-free.

However, to ensure reliable operation and maximize the operating life of the instrument, it is recommended that the instrument, its external electrical and process connections, and external connected devices be regularly inspected, e.g.:

- Check the display.
- Check the switching function in connection with secondary components.
- Check all pressure connections for leak-tightness.
- Check the integrity of all electrical connections of the instruments.

Inspection and test schedules depend on operating and site conditions. The operating manuals of other equipment to which the differential pressure transmitter is connected must be read thoroughly to ensure that all of them work correctly when connected together.

7 Transport

The product must be protected against shock and vibration during transport. It must therefore be properly packed, preferably in the original factory packaging, whenever it is to be transported.

8 Service

Any defective devices or devices with missing parts should be retoured to Fischer Mess- und Regeltechnik GmbH. For quick service contact our service department.

Remaining medium in and on dismantled measuring instruments may cause danger to persons, environment and equipment. Take reasonable precautions! Clean the instrument thoroughly if necessary.

9 Accessories

Connection line M12 in accordance with IEC 61076-2-101

10 Disposal

Protect your environment!

Use the product in accordance with relevant regulations. Please be aware of environmental consequences of disposal at the end of the product's life, and take care accordingly.

11 Technical Data

Measuring range	-20...20 mbar	-40...40 mbar	-100...100 mbar	0...60 mbar	0...100 mbar	0...200 mbar	0...400 mbar	0...600 mbar	0...1 bar	0...1.6 bar	0...2.5 bar	0...4 bar	0...6 bar	0...10 bar	0...16 bar	0...25 bar	0...40 bar	-0.6...0 bar	-1...0 bar	-1...0.6 bar	-1...1.5 bar	-1...3 bar	-1...5 bar	-1...9 bar	-1...15 bar
smallest measuring span (see turn down)	10 mbar	20 mbar	40 mbar	12 mbar	20 mbar	40 mbar	80 mbar	120 mbar	0.20 bar	0.32 bar	0.5 bar	0.8 bar	1.2 bar	2 bar	3.2 bar	5 bar	8 bar	0.12 bar	0.2 bar	0.32 bar	0.5 bar	0.8 bar	1.2 bar	2.0 bar	3.2 bar
Overpressure safety [bar]	4	4	4	4	4	4	1,0	3,0	3,0	7,5	7,5	15	15	30	90	90	150	3,0	3,0	3,0	7,5	15	15	30	90
	ceramic measuring cell						piezo-resistive measuring cell																		

General:

Accuracy	± 0.2 % of measuring range FS (incl. hysteresis and repeat accuracy)
Temperature drift Zero point /measuring range	±0.01% FS/K temperature error band across the compensated temperature range
compensated temperature range	- 10 °C to 70 °C
perm. ambient temperature	without display - 20 °C to 80 °C with display - 20 °C to 70 °C
perm. permanent medium temperature	- 10 °C to 85 °C
Storage temperature	- 40 °C to 90 °C
Display	3 1/2 digit LC display
Protection class	IP65 as per DIN EN 60529
Pressure connection	see ordering code
Material of parts in contact with medium	Chromium-nickel steel 1.4404, Ceramic Al_2O_3, VITON® gasket
Housing material	Chromium-nickel steel 1.4404/1.4571

Electrical data:

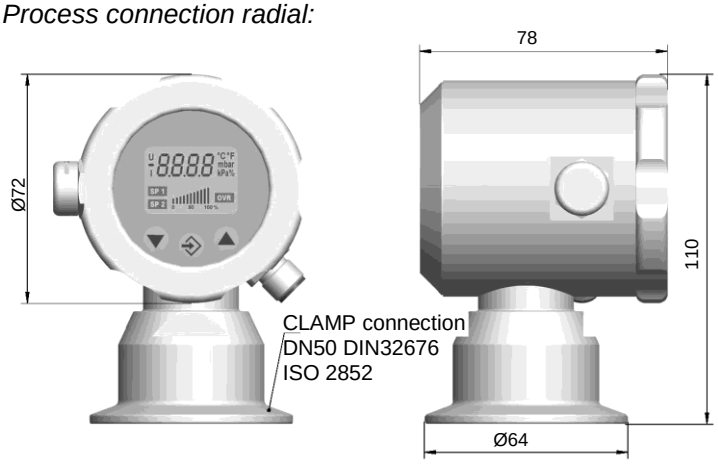
Nominal voltage	24V DC	
Operating voltage range U_b	12...30 VDC	
Electrical connection mode	**Two-wire**	**Three-wire**
Output signal	4...20 mA	0...20 mA / 4...20 mA
Load R_L	$R_L \leq (U_b - 6\ V) / 0.02\ A$	$R_L \leq ((U_b\text{-}10V) \cdot 50\ \Omega) + 300\ \Omega$
Current limit	approx. 26 mA	approx. 26 mA
Plug-in connector M12	5-pole	8-pole
Switch contacts	no	2 Photo MOS relays non short-circuit proof thermically insulated
		U_{max} **I_{max}** **R_{ON}**
floating [AC/DC]		30 V 200mA <1Ω
PNP/NPN-switching [DC]		U_b 200mA <1Ω

Parameterisation:

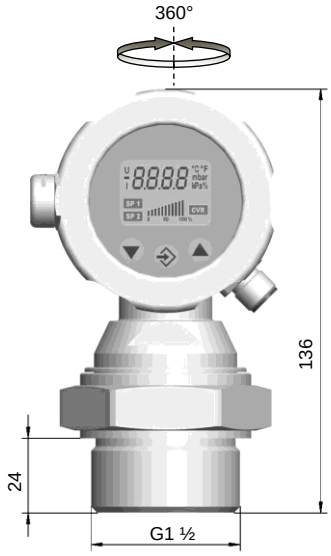
Inverted curve	rising / falling
curb	0...200 s
Adjustable signal limits	upper current limit 3.5...22.5 mA lower current limit 3.5...22.5 mA error signal 3.5...22.5 mA
Turn down	5:1 Set with parameters 'measuring range start value' and 'measuring range end value' and smallest adjustable measuring span within the measuring range.

12 Dimension drawin*(all dimensions in mm unless stated otherwise)*

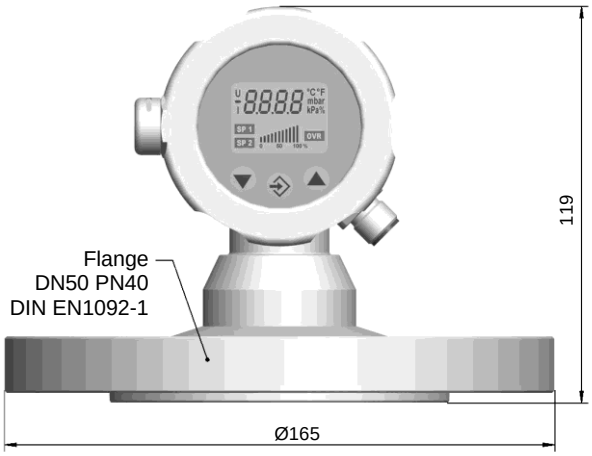
Process connection radial:



Pressure connection J5

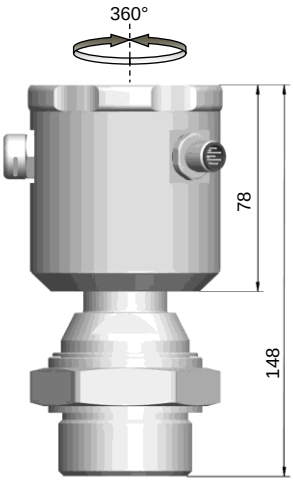


Pressure connection A4



Pressure connection F5

Process connection axial:



Pressure connection A4
(Connections J5 and 5 are also possible.)

13 Ordering code

Programmable pressure transducer

Type ME50 | | | | | | | | **M** | **D** | | **0** | **0** |

Measuring range

-20 … 20	mbar	>	**C 7**	ceramic measuring cell
-40 ... 40	mbar	>	**C 5**	
-100 ...100	mbar	>	**P 4**	
0 ... 60	mbar	>	**5 8**	
0 ...100	mbar	>	**5 9**	
0 ...200	mbar	>	**4 4**	
0 ...400	mbar	>	**8 3**	piezo-resistive measuring cell
0 ...600	mbar	>	**0 1**	
0 ... 1	bar	>	**0 2**	
0 ... 1.6	bar	>	**0 3**	
0 ... 2.5	bar	>	**0 4**	
0 ... 4	bar	>	**0 5**	
0 ... 6	bar	>	**0 6**	
0 ... 10	bar	>	**0 7**	
0 ... 16	bar	>	**0 8**	
0 ... 40	bar	>	**0 9**	
-0.6 ... 0	bar	>	**1 0**	
-1 ... 0	bar	>	**3 0**	
-1 ... 0.6	bar	>	**3 1**	
-1 ... 1.5	bar	>	**3 2**	
-1 ... 3	bar	>	**3 3**	
-1 ... 5	bar	>	**3 4**	
-1 ... 9	bar	>	**3 5**	
-1 ... 15	bar	>	**3 6**	
-1 ... 0	bar	>	**3 7**	

Discharge port

G1 ½ (360° rotatable)	>	**A 4**
Clamp flange connection DN50 DIN 32676 / ISO 2852	>	**J 5**
Flange connection DN50 DIN EN 1092-1	>	**F 5**

Display

without display	>	**A**
with display	>	**P**

Electrical output signal

4 ... 20 mA	2-wire	>	**P**
0 ... 20 mA	3-wire	>	**A**
4 ... 20 mA	3-wire	>	**P**

Switch contacts

without switch contacts	>	**M**
two floating semiconductor switches [AC/DC] (3-wire only)	>	**N**
two semiconductor switches PNP-switching [DC] (3-wire only)	>	**8**
two semiconductor switches NPN-switching [DC] (3-wire only)	>	**9**

Electrical connection

M12 plug-in connection	>	**M**

Operating voltage

12 ... 30 VDC	>	**D**

Process connection

axial	>	**A**
radial	>	**P**

13.1 Accessories

Art.No.	Description	Number of poles	Length
09001844	Connection line with M12 coupling	8-pole	2m
09001995	Connection line with M12 coupling	5-pole	2m
EU13.F200	PC Interface for 2-wire transmitter incl. software		

14 Declaration of Conformity

EG-Konformitätserklärung

Wir erklären in alleiniger Verantwortung, dass nachstehend genannte Produkte

EC Declaration of Conformity

We declare under our sole responsibility that the products mentioned below

Programmierbarer Druckmessumformer / Druckschalter

Programmable Pressure Transducer / Pressure Switch

ME50#######MD#00

gemäß gültigem Datenblatt übereinstimmen mit den

as specified by the current data sheet complies with

EG-Richtlinien

2004/108/EG (EMV)
2006/95/EG (NSR)

EC-directives

2004/108/EC (EMC)
2006/95/EC (LVD)

Die Produkte wurden entsprechend der folgenden Normen geprüft (Störfestigkeit für Industriebereich, Störaussendung für Wohnbereich):

DIN EN 61326-1:2006-10
DIN EN 61326-2-3:2007-05
DIN EN 61010-1:2002-08

The products were tested in compliance with the following standard (Interference immunity for industrial environments, interface emission for residential environments)

DIN EN 61326-1:2006-10
DIN EN 61326-2-3:2007-05
DIN EN 61010-1:2002-08

Die Geräte werden gekennzeichnet mit:

The devices bear the following marking:

CE

Bad Salzuflen, 02.12.10
(Ort, Datum / place, date)

(Rechtsverb. Unterschrift / legally authorized signature)

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